

## *Casuistics*

# **Intraventricular hemorrhage originating from choroid plexus angioma in a road accident victim**

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**Summary.** A 76-year-old woman sustained severe multiple injuries when hit by a car. During the treatment a massive intraventricular hemorrhage was found by computer tomography. The postmortem examination revealed no craniocerebral injuries except for a small contused wound of the scalp. Microscopic examinations revealed a choroid plexus angioma in the lateral ventricle as the cause of the hemorrhage into cerebral ventricles.

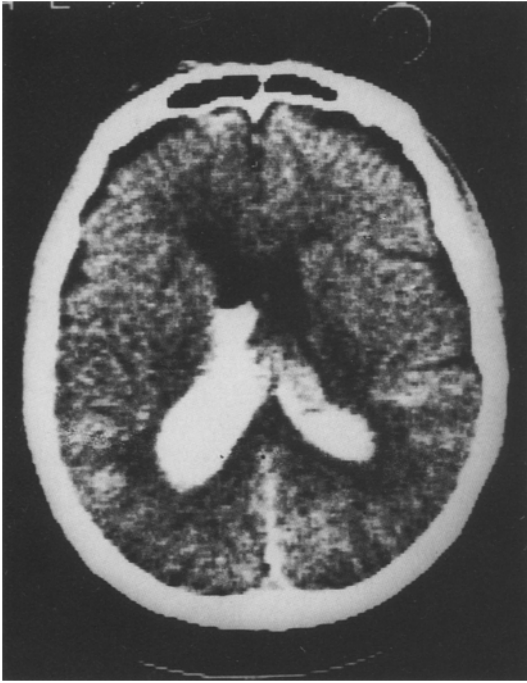
**Key word:** Intraventricular hemorrhage, choroid plexus angioma

**Zusammenfassung.** Eine 76jährige Frau erlitt infolge eines Autounfalls zahlreiche Verletzungen. Im Verlauf der Behandlung ließ die Computertomographie des Kopfes eine massive intraventrikuläre Hämorrhagie erkennen. Post mortem wurden außer einer kleinen Kopfplatzwunde keine kraniozerebralen Verletzungen nachgewiesen. Mikroskopische Untersuchungen ergaben, daß die Ursache der Hämorrhagie in den zerebralen Ventrikeln ein Angiom des Plexus chorioideus war.

**Schlüsselwörter:** Intraventrikuläre Hämorrhagie, Angiom des Plexus chorioideus – Plexusverletzung

## **Introduction**

In forensic practice intraventricular hemorrhage is usually found in association with craniocerebral traumas, most often in cases with diffuse brain damage. In such cases bleeding is due to disruption of the ventricle wall by an intracerebral hematoma or by rupture of the subependymal veins caused by negative pressure during sudden dilatation of the ventricles at the time of the trauma [2, 3, 7, 10]. Spontaneous bleeding into the ventricles, which can occur, for example in the presence of vascular malformations localized within the arterial circle, subependymally or in the choroid plexus, are seldom observed [1, 4, 5, 6].



**Fig. 1.** CT scan showing a massive fresh hemorrhage into enlarged lateral ventricles

A case of primary intraventricular hemorrhage is presented: this case is remarkable both in the source of bleeding and in the temporal relationship between the hemorrhage and the head trauma.

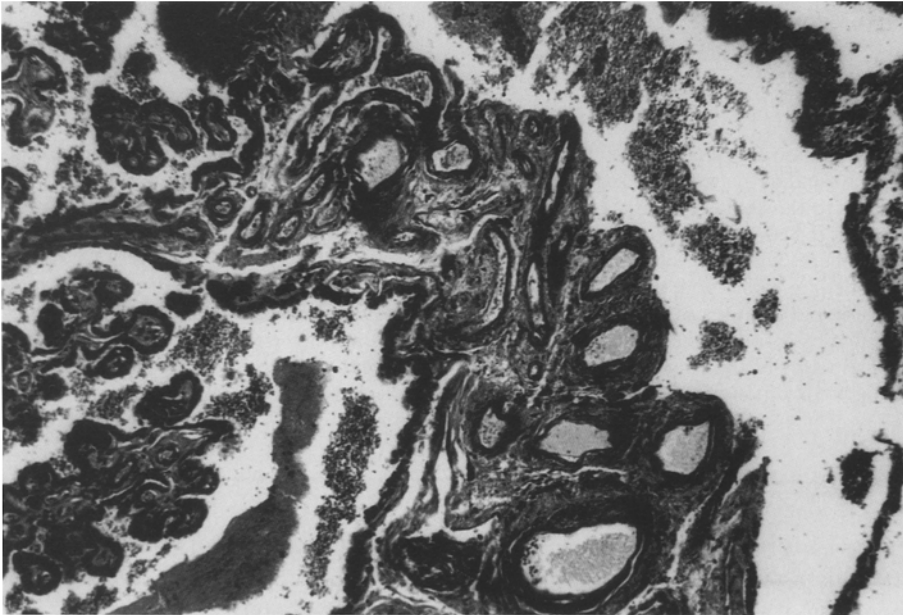
### Case report

A 76-year-old woman was hit by a car and was admitted to the surgical unit 30 min after the event. She was conscious and cooperative, with no symptoms of focal damage to the central nervous system or neck stiffness. Her arterial blood pressure was 170/70 mmHg and her pulse rate, 120/min. Multiple injuries were found: a small contused wound to the scalp in the right temporal region. Fracture of the calvicle and of ribs II–IV on the right side and ribs III–VII on the left with pneumothorax and hemorrhage into the pleural cavity, fractures of both pubic and ischial bones with laceration of the urinary bladder, comminuted fracture of the right femur and both tibias (Injury Severity Score 66). After infusion of fluids the patient was still cooperative, with blood pressure 160/110 mmHg, tachycardia and tachypnea. She was intubated, subjected to controlled ventilation, and operated on after 2 h. Drainage of the left pleural cavity and exploratory laparotomy were performed and the urinary bladder was sutured. The broken bones in both lower extremities were set. The continued drug and shock-controlling treatment caused the blood systolic pressure to stabilize at 90–100 mmHg. Controlled ventilation was maintained, periodically with PEEP. Despite antiedematous treatment a deterioration in the patient's state of consciousness was observed at night, and the next morning she lapsed into shallow unconsciousness. During the next few hours the patient gradually worsened, convulsions, paralysis of breathing and deep unconsciousness occurred (GCS 3). A tomography examination revealed a massive fresh intraventricular hemorrhage at the supra- and subtentorial levels (Figs. 1, 2).

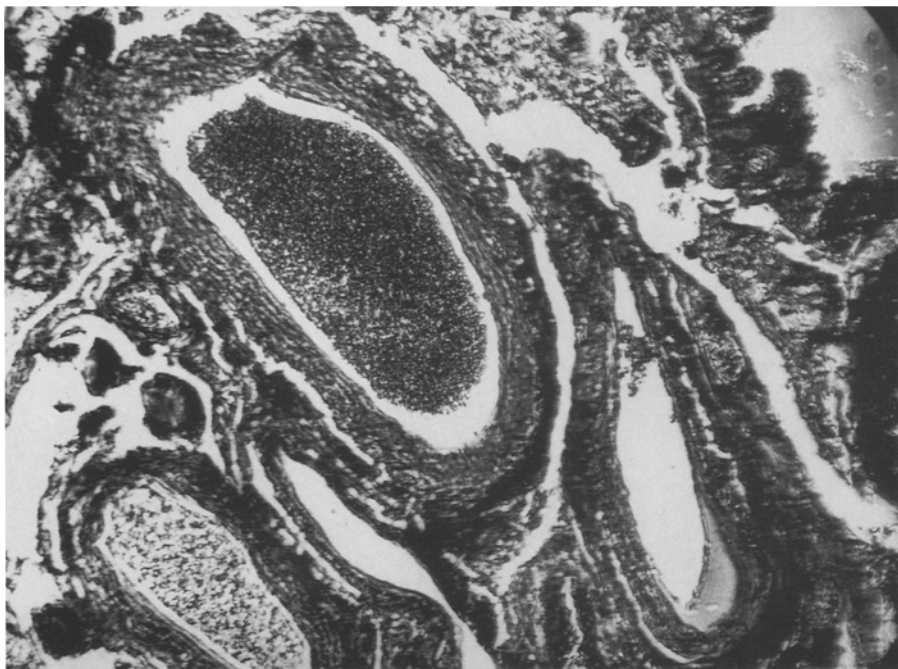
Drainage of the ventricular system was not undertaken because of the patient's advanced age and her general condition. Aminocaproic acid and etamsylate were administered. Bradycardia



**Fig. 2.** CT scan: fresh blood filling up third and fourth ventricle



**Fig. 3.** Photomicrograph of abnormal blood vessels in choroid plexus of lateral ventricle (angioma arteriosum). (H & E,  $\times 120$ )



**Fig. 4.** Photomicrograph of enormous vessels surrounded by fronds of choroid plexus (angioma arteriosum). (Trichrom,  $\times 250$ )

then occurred, and the patient died with the symptoms of increasing intracranial pressure 25 h after the accident.

#### *Necropsy findings*

At the postmortem examination the clinically diagnosed injuries were confirmed. A small contused wound of the temporal region of the head was observed, with suffusions of the scalp. No injuries to the skull, dura and brain were detected. Slight subarachnoid extravasations were found at the convexity of the cerebral hemispheres and more prominent ones in the cerebellar hemispheres without contusion of the brain tissue were found. The whole ventricular system was filled up with blood, particularly the left lateral ventricle, the lumen of which was dilated. The choroid plexuses of the lateral ventricles showed no macroscopic changes and were surrounded by blood clots adhering to the ependyma of the ventricles walls. Microscopically, the normal tissue of the choroid plexus of the left lateral ventricle was found to have undergone changes corresponding to the picture of angioma arteriosum (Figs. 3, 4).

#### **Discussion**

In the case presented, the postmortem findings fully confirm that a congenital angioma arteriosum localized in the choroid plexus of the lateral ventricle was the cause of the intraventricular hemorrhage. As the hemorrhage occurred in a person who had sustained severe multiple injuries, the possibility of a relationship between the bleeding and the head trauma had to be considered. In the litera-

ture the possibility that a latent vascular malformation situated subependymally or in the choroid plexus might rupture as a result of head trauma is indicated. Nonetheless, it is extremely rare in practice for a head injury to coincide with such bleeding, and in the cases observed the notion of a causal relationship has never been more than the subject of speculations [8, 9]. Similarly, in our case, analysis of the patient's post-traumatic history did not allow us to determine the precise moment at which the hemorrhage into the ventricles started. After the accident, multiple injuries to the trunk and lower extremities were initially predominant in the clinical picture, whereas there were no symptoms suggesting damage to the central nervous systems. In addition, on autopsy, the small contused wound of the scalp suffused with blood was the only finding proving minor head trauma. All these facts would undermine the thesis of traumatic rupture of the choroid plexus vascular malformation.

Finally, as far as the penal code is concerned, we came to the conclusion that the intraventricular hemorrhage occurred spontaneously during the treatment of injuries sustained in the accident and there was no causal relationship with the minor head trauma.

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